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ABSTRACT

The effects of crowding and sex on reactions to a side-to-side invasion of personal space were examined. Male or female experimenters violated the personal space of 40 male and 40 female subjects who were sitting at library tables that were either crowded (several persons present) or uncrowded (subjects sat alone). The subjects' body movements, chair movements, and flight (leaving within eight minutes) were recorded. It was found that female subjects reacted to a male invader only in the uncrowded condition, while male subjects reacted to the male invader in both conditions. Reactions to a female invader did not vary significantly across the experimental conditions. (Author/RL)

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Crowding and the Sex Variable in the Invasion of Personal Space

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Crowding and the Sex Variable in the Invasion of Personal Space

Research has demonstrated that invasions of personal space frequently result in flight (Felipe & Sommer, 1966) or other compensatory responses (Patterson, Mullens, and Romano, 1971). Harris, Luginbuhl, and Fishbein (1978) suggested that the common finding of negative reactions to invasions may occur because most personal space studies are conducted in an uncrowded setting. Employing an attributional analysis, they argued that the cause of an invasion can reside in either the invader (e.g., aggressiveness) or the situation (e.g., crowdedness). In an uncrowded setting the most plausible cause for the invasion will reside in the invader rather than in the situation. Therefore, in an uncrowded setting one is likely to perceive the invasion as intended by the invader and, consequently, react negatively to it. Using Kelley's (1972) discounting principle--which states that an explanation for an individual's behavior is discounted to the extent that other plausible explanations exist--Harris et. al. (1978) argued further that in a crowded setting, the invasion may be attributed to either the intent of the invader or to the general density of the situation. Therefore, in a crowded setting one may be less likely to react to an invasion because it may not be intended by the invader.

Harris et. al. (1978) examined the impact of crowding on reactions to personal space invasions in a field study that also included the sex of both the invader and the subject in its design. Invasions occurred by having an experimenter descend the stairs of an escalator until he/she stood directly behind the subject. The escalator was either uncrowded (the subject and less than four other people), or crowded (the subject and at least four other people). The only significant effect was that male subjects reacted more to a male invader in an uncrowded setting than in a

crowded setting.

Harris et. al. (1978) may have found that crowding had a limited impact on reactions to personal space invasions for several reasons. First, they examined reactions to invasions from behind. A number of studies (e.g., Madsen, Note 1; McBride, King and James, 1966) have found that subjects do not react strongly to rear invasions, perhaps because visual stimulation is minimal. A second reason may be that Harris et. al. (1978) did not adequately control for the possibility that invasions in their uncrowded condition could be attributed to an external or situational cause. Subjects may have assumed that the invader was in a hurry since he/she descended several steps down the escalator before stopping. Subjects may have further assumed that the invader stopped behind them because his/her path was blocked by the subject and the narrowness of the escalator (two feet wide). Consequently, the invasion in the uncrowded setting could have been easily attributed to the situation (a blocked path) rather than to the invader.

The purpose of the present study, then, was to reexamine the impact of crowding on reactions to personal space invasions. Unlike the study by Harris et. al. (1978), responses to side-to-side invasions were investigated. Numerous studies have indicated that individuals do react to side-to-side invasions (e.g., Fisher & Byrne, 1975; Krail & Leventhal, 1976). The present study also employed a field setting in which subjects were unlikely to attribute the invasion in the uncrowded setting to an external cause.

Similar to the study by Harris et. al. (1978), the present study also included the sex of both the invader and the subject in its design. Field studies on personal space have consistently reported that females are more likely to react to a side-to-side invasion than are males (e.g., Fisher & Byrne, 1975). In addition, Krail and Leventhal (1976) found that a side-to-

side invasion by a male produced more reactions than a similar invasion by a female. Harris et. al. (1978) suggested that these sex differences only occur when the cause of the invasion appears to reside in the invader. If Harris et. al. (1978) is correct, then in the present study the above sex differences should be found in an uncrowded setting but not in a crowded setting. Thus, a second purpose of the study was to examine the impact of crowding on the reactions of male and female subjects to male and female invaders.

Method

Subjects and Design

Subjects were 80 "naive" college-aged students (40 males and 40 females) who were sitting at study tables in a college library. The study employed a 2 (sex of subject) x 2 (sex of invader) x 2 (crowded vs. uncrowded) factorial design.

Procedure

The setting was a college library in which students were studying at large, rectangular tables. Tables at which the subject sat alone were defined as crowded. Each pair of experimenters contained a male and a female who alternated in taking the roles of invader and recorder. The sex of the subject and the condition of crowding were randomly selected. The experimenter who occupied the role of invader chose a chair adjacent to the subject and sat approximately 12 inches away. The second experimenter, positioned to be unobtrusive, then recorded the subject's body movement (0 = unchanged, 1 = oriented away from invader), chair movement (0 = unchanged, 1 = oriented away from invader) and flight (0 = remained for eight minutes, 1 = fled within eight minutes). As Hayduk (1978) has noted, a widely accepted measure of reactions to personal space invasions in field settings has not been adopted.

The above behaviors were recorded because they are frequently found in studies on personal space invasions. The scoring procedure was used because it proved reliable across experimenters. Finally, the sex of the subject, the sex of the invader, and the condition of crowding were also recorded.

Results

The three behavioral responses that were recorded revealed a similar pattern of results across the experimental conditions. Therefore, in order to create a sensitive, reliable measure (Hayduk, 1978) that would reflect the extent of reaction to the invasion, an index was calculated by summing a subject's scores for body movement, chair movement, and flight. Scores for this overall index, which varied from 0 to 3, were subjected to a 2 (sex of subject) x 2 (sex of invader) x 2 (crowding) analysis of variance for a between-subjects design.

The only significant main effect that occurred was for sex of invader, F (1, 72) = 9.15, $p < .01$. As Krail and Leventhal (1976) found, a male invader (M = 1.075) produced more reaction than did a female invader (M = .50). However, the sex of invader by crowding interaction approached significance, F (1, 72) = 3.71, $p = .06$. The means for this interaction are presented in Table 1. Tests of simple effects were employed to examine this interaction further. As Harris et. al. (1978) suggested, an invasion by a male resulted in more reaction than an invasion by a female in the uncrowded condition ($p < .001$) but not in the crowded condition ($p < .10$).

A significant sex of subject by crowding interaction was also found, $F = 5.03$, $p < .05$). The means for this interaction are presented in Table 2. Again, as Harris et. al. (1978) suggested, tests of simple effects revealed

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Put Table 1 about here

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that female subjects reacted more to the invasion in the uncrowded condition than in the crowded condition ($p < .05$). Also, female subjects reacted more to the invasion than did male subjects in the uncrowded condition ($p < .10$) but not in the crowded condition ($p > .10$).

Put Table 2 about here

Finally, a sex of subject by sex of invader by crowding interaction was significant, F (1, 72) = 5.94, $p < .05$). Table 3 presents the means for this interaction. Tests of simple effects showed that in the uncrowded condition female subjects reacted more to the male invader than did male subjects ($p <$

Put Table 3 about here

.01). However, in the crowded condition, male subjects reacted more to the male invader than did female subjects ($p < .05$). Furthermore, female subjects reacted more to a male invader than to a female invader in the uncrowded condition ($p < .01$), while male subjects reacted more to the male invader than to the female invader in the crowded condition ($p = .06$). Finally, female subjects reacted more to a male invader in the uncrowded condition than in the crowded condition ($p < .01$), while this difference was nonsignificant for male subjects ($p > .10$).

Discussion

The present results indicate that crowding does have a considerable impact on reactions to personal space invasions. The pattern of effects, however, is complex and involves the sex of the subject as well as of the invader. The three-way interaction further indicates that Harris et. al. (1978) are only partially correct in their predictions about the relationship among crowding, sex of subject, and sex of invader. As they expected, female

subjects did react more to a male invader than to a female invader only in the uncrowded condition. Also, female subjects were more likely to react to the side-to-side invasion than male subjects only in the uncrowded condition. Although attributional data is lacking, the results for female subjects suggest that they reacted to the invasion by a male in the uncrowded condition because it was easily interpreted as an aggressive ~~sexual~~ (perhaps sexual) overture. The invasion by a female in the uncrowded setting may not have produced a similar reaction because males are generally believed to be more aggressive than females (Maccoby & Jacklin, 1974).

In contrast to female subjects, male subjects reacted more to the male invader than to the female invader only in the crowded condition. This finding is contrary to the predictions of Harris et. al. (1978). The general pattern of results for male subjects further suggests that they reacted to a male invader in both the uncrowded and crowded conditions. Again, attributional data is lacking but the results indicate that male subjects acted to avoid physical closeness with another male. Other studies have also found that males in same-sex groups prefer larger physical distances separating them than do females in same-sex groups (Epstein & Karlin, 1975; Sommer, 1969). Liebman (1970) has suggested that this sex difference in the use of physical distance may be a consequence of the socialization process: males are trained to avoid intimacy with other males while women are trained to express affection to each other. The findings of Ross et. al. (1973) supports this interpretation.

In summary, the present study examined side-to-side invasions of personal space under varying conditions of crowding. Results indicated that females only reacted to an invasion by a male in an uncrowded setting. Males reacted to a male invader in both conditions of crowding. Finally, reactions to a

female invader were not affected systematically by the experimental conditions.

Reference Notes

1. Madsen, D. Personal Space: An oddly shaped bubble. Paper presented at the Fifty-second Annual Meeting of the Midwestern Psychological Association, St. Louis, Missouri, 1980.

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Footnotes

1. [1]The authors would like to thank the undergraduate students in a course in research methods in social psychology who served as the experimenters. A brief version of this article was presented at the annual meeting of the Midwestern Psychology Association, St. Louis, Missouri, 1980. Address all communications to Ronald L. Michelini, Department of Psychology, State University College at Buffalo, Buffalo, New York, 14222.

Table 1

Means of Subjects' Reactions to Personal Space Invasions for Sex of Invader by Crowding Interaction.

Sex of Invader	Crowding Condition	
	Uncrowded	Crowded
Female	.40	.60
Male	1.35	.80

Table 2

Means of Subjects' Reactions to Personal Space Invasions for Sex of Subject by Crowding Interaction.

Sex of Subject	Crowding Condition	
	Uncrowded	Crowded
Female	1.10	.55
Male	.65	.85

Table 3

Means of Subjects' Reactions to Personal Space Invasions for the Sex of Subject by Sex of Invader by Crowding Interaction.

	Crowding Condition	
	Uncrowded	Crowded
Female Subjects, Female Invader	.40	.70
Female Subjects, Male Invader	1.80	.40
Male Subjects, Female Invader	.40	.50
Male Subjects, Male Invader	.90	1.20